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NATIONAL AIRSPACE SYSTEM

Reauthorizing FAA Provides Opportunities and Options to Address Challenges

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Mr. Chairman and Members of the Committee:

We are pleased to be here today to discuss issues relevant to ensuring the safe and efficient operation of the national airspace system. These issues are particularly relevant as you prepare to reauthorize the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR-21). Much has changed since the Congress enacted AIR-21 3 years ago. As you know, the downturn in the nation's economy and the terrorist attacks of September 11, 2001, have taken a heavy toll on aviation. Flights that were once filled are now being canceled for lack of business, and attention has shifted from increasing the capacity of the national airspace system to enhancing aviation security. Furthermore, as the federal budget deficit has increased, competition for federal resources has intensified.

The Congress and the administration have responded to the public's concerns about aviation security by federalizing airport screeners, upgrading and installing new airport screening equipment, and expanding the Federal Air Marshal Service. These security measures will continue to require and compete for federal funds. At the same time, the transfer of some key security responsibilities to the Transportation Security Administration, which recently moved to the new Department of Homeland Security, will allow the Federal Aviation Administration (FAA) to focus on the challenges it faces in improving the national airspace system. These challenges include (1) funding planned airport capital development, (2) increasing capacity and efficiency, (3) implementing human capital and procurement reforms, and (4) ensuring aviation safety.

My statement today is based on our ongoing work on airport funding and on our published reports addressing the other challenges. Because our information on planned airport capital development, including the information we obtained from surveying 400 smaller airports, is preliminary, it is subject to change.

In summary:

- Although it is generally agreed that maintaining the integrity of the national airspace system requires continual funding, estimates vary as to the type and cost of planned airport capital development needed to ensure a safe and efficient system. For 2001 through 2005, FAA has estimated annual planned capital development costs of about $9 billion, while the Airport Council International (ACI), a key organization representing the airport industry, has estimated annual costs of about $15 billion for 2002 through 2006. FAA's estimate includes only projects that are eligible for federal funding, whereas ACI's estimate includes projects that are both eligible and ineligible for federal funding. Neither FAA's nor ACI's estimate covers the airport terminal modifications needed to

accommodate the new explosives detection systems required to screen checked baggage. According to ACI, these modifications could cost $3 billion to $5 billion over the next 5 years. The Congress has not yet determined how these modifications will be funded. If airports continue to receive about $12 billion a year for planned capital development—the average amount they received from 1999 through 2001—they would be able to fund all of the projects included in FAA's estimate, but they would not be able to fund about $3 billion in planned development estimated by ACI. While this projected shortfall could change with revisions in future funding, planned development, or both, it nevertheless provides a useful indication of where funding differences may be the greatest. Options are available to increase or make better use of the funding for airport development, and these options would benefit different types of airports to varying degrees. For example, raising the current cap on passenger facility charges would primarily benefit larger airports, while increasing or redistributing Airport Improvement Program grant funds would be more likely to help smaller airports.

- To increase the capacity and efficiency of the national airspace system, FAA has focused on building new runways and modernizing air traffic control. Results have been mixed in both areas. FAA's Operational Evolution Plan, a 10-year blueprint for increasing capacity and efficiency, includes one new runway but notes the cancellation of another runway and delays in the construction of six others. Our work has identified challenges to runway development, including community opposition, environmental concerns (especially noise issues), and litigation.[1] Because of these and other challenges, airports have taken about 10 years to plan and build runways, and they expect to take about 14 years for runways that are not yet completed. Several federal initiatives, such as an executive order designed to streamline the environmental review process, are designed to facilitate runway development, but we believe it is too early to assess their impact. To modernize air traffic control, FAA spends almost $3 billion annually, but its progress has been slow because of cost overruns, schedule delays, and performance shortfalls. As a result, we designated this area as high risk in 1995, and it remains at high risk today. FAA has made some progress in addressing the root causes of its modernization problems—by, for example, improving its cost-estimating and cost-accounting practices—but it has not yet determined which modernization technologies and initiatives are most likely to increase capacity and efficiency and what impact the current financial condition of the airline industry will have on the implementation of planned modernization efforts.

[1]U. S. General Accounting Office, *Aviation Infrastructure: Challenges Related to Building Runways and Actions to Address Them,* GAO-03-164 (Washington, D.C.: Jan. 30, 2003).

- Recognizing the importance of effective human capital and acquisitions management to FAA's ability to achieve its mission, the Congress exempted FAA from many federal human capital and acquisitions laws, and FAA began implementing reforms in these areas in 1996. FAA has made progress in implementing the reforms. However, as we reported last week,[2] FAA has not yet finished implementing some key human capital management initiatives, in part because it needs to negotiate changes with multiple unions. FAA also lacks data on the effects of its human capital initiatives, indicating that it has not fully incorporated important elements into its human capital reform effort, including data collection and analysis, performance goals and measures, and links between its reform goals and program goals. Developing a strategic approach to human capital management is particularly important because FAA faces the likelihood of hiring thousands of air traffic controllers in the next decade to fill vacancies caused by retirements. To improve its procurement management, FAA implemented an acquisitions management system that is now capturing key information; however, FAA has not yet put processes in place to evaluate projects after implementation so that it can identify lessons learned and improve the investment management process.
- Finally, FAA and the Congress have taken important steps to enhance aviation safety; however, some challenges remain. Safer Skies, an initiative designed by FAA and the aviation industry to reduce the nation's fatal aviation accident rate by 80 percent by 2007, is the centerpiece of FAA's efforts to improve aviation safety. The initiative was implemented in 1998 and many preventive actions are under way but have not yet been fully implemented. Another key to improving aviation safety is effective inspections of the nation's airline operations. In reporting on FAA's redesigned Air Transportation Oversight System in 1999, we noted that it incorporated important features to ensure that airlines have systems to control risks and prevent accidents, but that it had encountered startup problems with inspector training and guidance.[3] Many of these problems were not yet fully resolved when the Department of Transportation's Inspector General reported on the inspection system last year.[4] Finally, to reduce the risk of accidents, the Congress enacted the Pilot Records Improvement Act of 1996, which requires air carriers to review information on a pilot's performance,

[2]U.S. General Accounting Office, *Human Capital Management: FAA's Reform Effort Requires a More Strategic Approach,* GAO-03-156 (Washington, D.C.: Feb. 3, 2003).

[3]U.S. General Accounting Office, *Aviation Safety: FAA's New Inspection System Offers Promise, but Problems Need to Be Addressed*, GAO/RCED-99-183 (Washington, D.C.: June 28, 1999).

[4]U.S. Department of Transportation, Office of Inspector General, *Report on the Air Transportation Oversight System: Federal Aviation Administration*, AV-2002-088 (Washington, D.C.: Apr. 8, 2002).

qualifications, and training before making a final hiring decision. As we reported in 2002,[5] compliance with the act has improved over time, but FAA needs to update its guidance and incorporate information on the act in the agency's training for inspectors so that they can more effectively monitor and enforce compliance, particularly among the smaller carriers.

Prior Years' Funding Levels Would Cover Projects Included in FAA's Estimate, but Not All Planned Capital Development

Both FAA and ACI have estimated the costs of planned airport capital development. Our analysis indicates that recent funding levels would cover the costs estimated by FAA, but not all the costs estimated by ACI. Options for addressing the potential difference between funding and planned development estimates include increasing or reallocating Airport Improvement Program (AIP) grant funds and removing the current cap on passenger facility charges.

FAA's and the Airport Industry's Estimates of Planned Capital Development Vary Substantially

The estimated costs of planned airport capital development vary depending on which projects are included in the estimates. According to FAA's estimate, which includes only projects that are eligible for AIP grants, the total cost of airport development will be about $46 billion, or over $9 billion per year, for 2001 through 2005. FAA's estimate is based on the agency's National Plan of Integrated Airport Systems, which FAA published in August 2002. ACI's estimate includes all of the projects in FAA's estimate, plus other planned airport capital projects that may or may not be eligible for AIP grants. ACI estimates a total cost of almost $75 billion, or nearly $15 billion per year, for 2002 through 2006. Projects that are eligible for AIP grants include runways, taxiways, and noise mitigation and noise reduction efforts; projects that are not eligible for AIP funding include parking garages, hangars, and expansions of commercial space in terminals.

Both FAA's and ACI's estimates cover projects for every type of airport. As table 1 indicates, the estimates are identical for all but the large- and medium-hub airports, which are responsible for transporting about 90 percent of the traveling public. ACI's estimates are about twice as large as FAA's for these airports.

[5]U.S. General Accounting Office, *Aviation Safety: Better Guidance and Training Needed on Providing Files on Pilots' Background Information*, GAO-02-722 (Washington, D.C.: Aug. 30, 2002).

Table 1: Average Annual Planned Development Costs Estimated by FAA and ACI, by Airport Type, 2001-2006

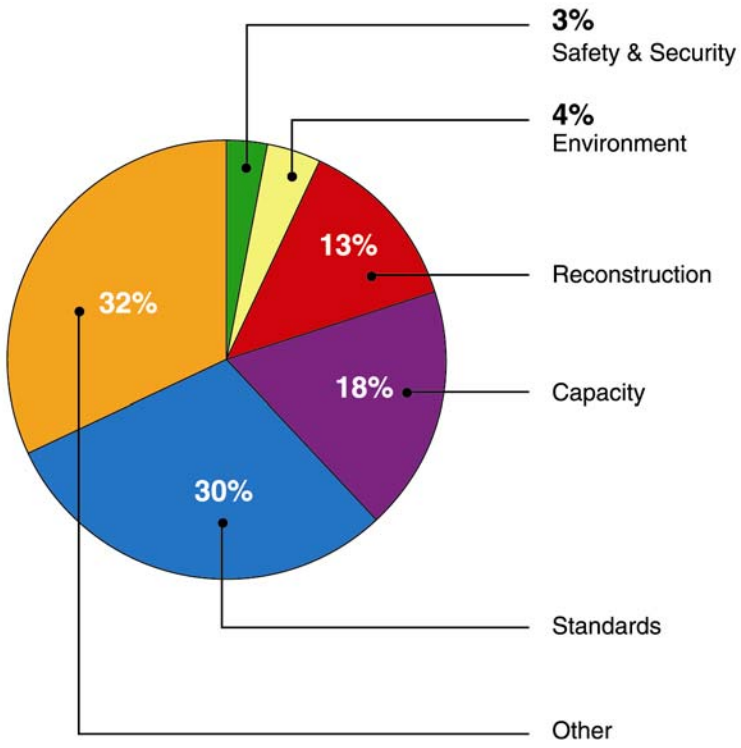
Dollars in millions

Airport type	Number of airports	Annual average FAA	Annual average ACI
Large hub	31	4,855	8,554
Medium hub	37	1,073	3,109
Small hub	71	675	675
Nonhub	280	807	807
Other commercial service	124	142	142
Reliever	260	526	526
General aviation	2,558	1,167	1,167
Total	**3,364**	**9,245**	**14,980**

Source: FAA and ACI.

According to FAA's analysis of the planned capital development for 2001 through 2005, airports will use (1) 61 percent of the $46 billion for capacity enhancement, reconstruction, and modifications to bring airports up to the agency's design standards and (2) 39 percent to fund safety, security, environmental, and other projects. See figure 1.

Figure 1: Distribution of FAA's Estimated $46 Billion for Planned Capital Development at Airports by Project Type, 2001-2005



Source: FAA.

Neither FAA's nor ACI's estimate includes funding for terminal modification projects that are needed to accommodate the new explosives detection systems. ACI estimates that terminal modifications will cost about $3 billion to $5 billion over the next 5 years. These projects are not currently eligible for AIP funding, and the Congress has not yet determined how they will be funded.

Airports Obtain Most Funding from Bonds and Federal Sources

From 1999 through 2001, the 3,364 airports that make up the national airport system received an average of about $12 billion per year for planned capital development. The single largest source of these funds was bonds, followed by AIP grants and passenger facility charges. (See table 2.) It is important to note that the appropriated AIP funding for fiscal year 2002 totaled $3.2 billion and that the authorized AIP funding for fiscal year 2003 is $3.4 billion. However, because data for funding from other sources were not available for these years,

we used the figures from 1999 through 2001, the most recent years for which consistent data were available.

Table 2: Sources of Airport Funding

Dollars in billions

Funding source	1999-2001 average annual funding[a]	Percent of total	Source of funds
Airport bonds	$6.90[b]	59	Usually, state and local governments or airport authorities issue tax -exempt debt. Funds also include notes.
Airport Improvement Program grants	2.42[c]	21	The Congress makes funds available from the Airport and Airway Trust Fund, which receives revenue from various aviation-related taxes.
Passenger facility charges	1.59[d]	13	Funds come from passenger fees of up to $4.50 per trip segment at commercial service airports.
State and local contributions	.44[e]	4	Funds include state and local grants, loans, and matching funds for AIP grants.
Airport revenue	.42[f]	4	Funds are generated from (1) “airside” revenues derived from the operation and landing of aircraft, passengers, or freight and (2) “landside” revenues derived from concessions and leases.
Total	**$11.78**	**100**	

Source: GAO, FAA, and Thomson Financial.

Note: Totals may not add because of rounding.

[a]Amounts expressed in inflation-adjusted 2001 dollars.

[b]Net of refinancing. Of this total, $1.43 billion per year represented the proceeds of special facility bonds, which are secured by revenue pledges from the indebted facility and issued on behalf of nonairport beneficiaries, such as airlines.

[c]Since the passage of AIR-21 in 2000, annual AIP funding has been at or above $3.2 billion. Before that, it was less than $2 billion.

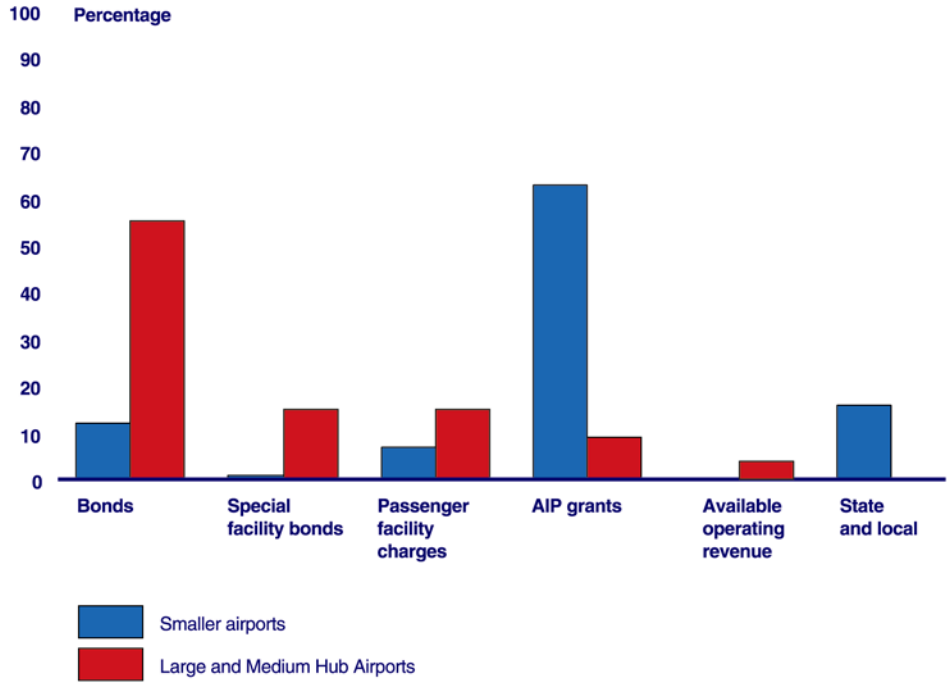
[d]Airports have been eligible to charge $4.50 since fiscal year 2001. Before that, the ceiling was $3.00.

[e]Net operating revenue in excess of a minimum coverage ratio of 125 percent of the debt service (principal and interest payments) for commercial service airports. For general aviation and reliever airports, amounts are calculated as net operating revenue.

[f]Does not include local grants and loans for commercial service airports because we found no data to document the amounts from these sources.

The amount and type of funding vary depending on the airport's size. For example, as shown in figure 2, the large- and medium-hub airports depend primarily on bonds, while the smaller airports rely principally on AIP grants. Passenger facility charges are a more important source of revenue for the large- and medium-hub airports because they have the majority of commercial service passengers.

Figure 2: Distribution of Sources of Funding, by Airport Type



Source: GAO.

Note: The 1999 and 2000 figures were converted to inflation-adjusted 2001 dollars.

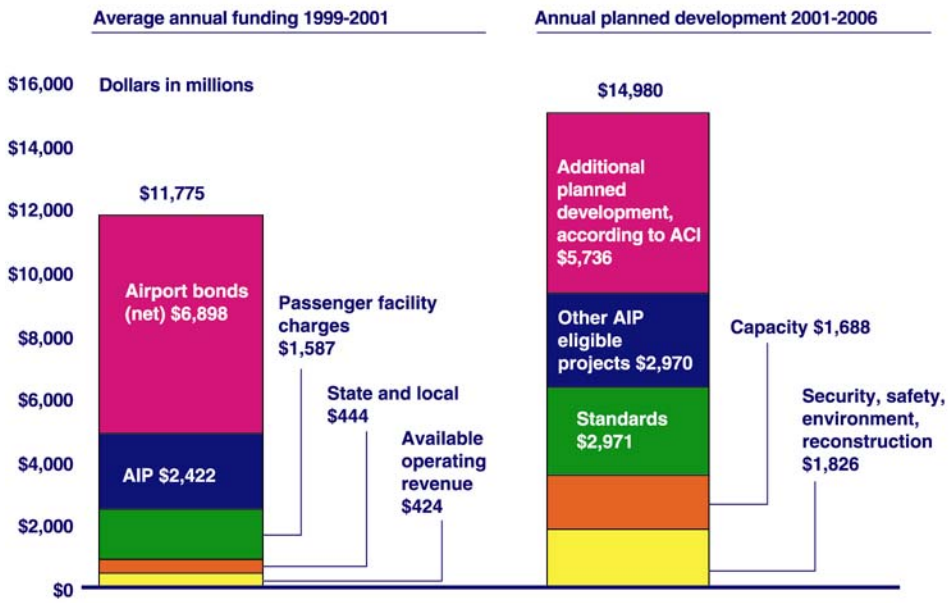
Note: Special facility bonds are secured by the revenue from the indebted facility for projects such as terminals, hangars, and maintenance facilities, rather than by the airport's general revenue.

Note: Available operating revenue accounts for less than 1 percent of the capital development funding received by smaller airports, and state and local contributions represent less than 1 percent of the capital development funding received by large- and medium-hub airports.

Prior Years' Funding Levels Would Cover All of FAA's Planned Development Estimate but Would Fall About $3 Billion Short of ACI's Estimate

If the funding for airport capital development remains at about $12 billion a year over the next 5 years, it would cover all of the projects in FAA's estimate. However, it would be about $3 billion less per year than ACI's estimate. Figure 3 compares the average annual funding airports received from 1999 through 2001 with FAA's and ACI's annual planned development for 2001 through 2006. This difference is not an absolute predictor of future funding shortfalls; both funding and planned development may change in the future. However, it does provide a useful indication of where funding differences may be the greatest.

Figure 3: Recent Average Annual Funding Compared with Estimates of Annual Planned Development Costs



Sources: FAA and ACI (data), GAO (analysis).

Funding Difference Would Affect Smaller Airports Proportionally More Than Larger Airports, but Difference Has Narrowed

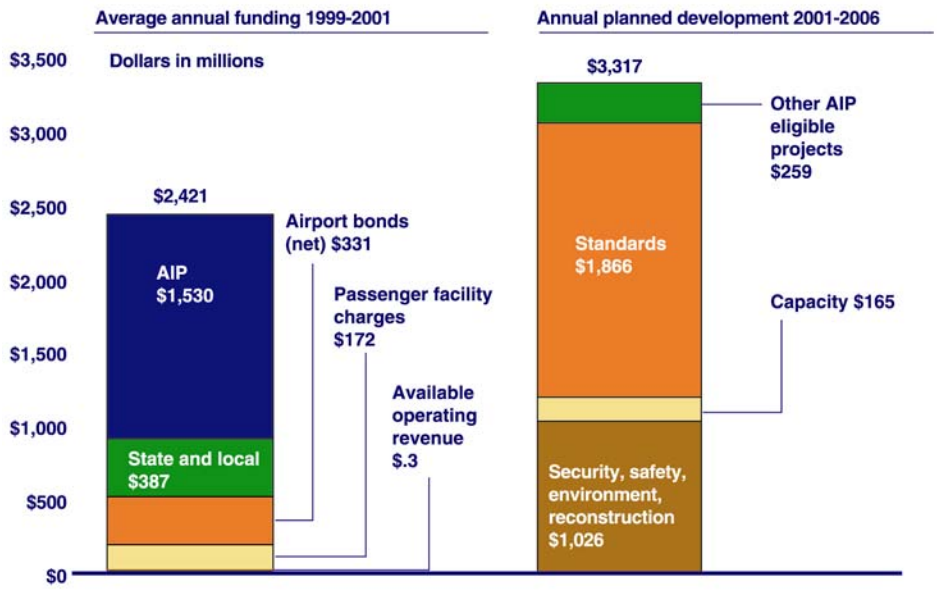
The difference between past funding and planned development is proportionally greater for smaller airports than for large- and medium-hub airports. If the smaller airports were to continue to receive an average of about $2.4 billion per year, they would be able to fund about 73 percent of the estimated cost of their total planned development. In comparison, large- and medium-hub airports would be able to fund about $9.4 billion per year, or about 80 percent, of the estimated cost of their total planned development. It is important to note that while the airlines may be experiencing financial problems, most large airports have very solid credit ratings and could, if necessary, issue more debt without

facing exorbitant interest rates. Figures 4 and 5 illustrate the differences between funding levels and estimated planned capital development at smaller and at large- and medium-hub airports.

The primary reason that smaller airports would be able to fund 73 percent of their planned development, rather than the 52 percent reported we reported in 1998, is that they have benefited significantly from the increases in AIP grants, which is a larger source of funding for smaller airports than it is for larger airports. Of the $2.4 billion in AIP grant funds that airports received each year, on average, from 1999 through 2001, smaller airports received almost 63 percent, whereas large- and medium-hub airports received about 37 percent. Smaller airports have received an increasing share of AIP grants primarily because of statutorily required changes in the distribution of these funds. For example, in AIR-21, the Congress increased the funding for two categories that primarily or exclusively benefit small airports—the state apportionment fund and the small airport fund—and created general aviation entitlement grants, which also benefit smaller airports.[6]

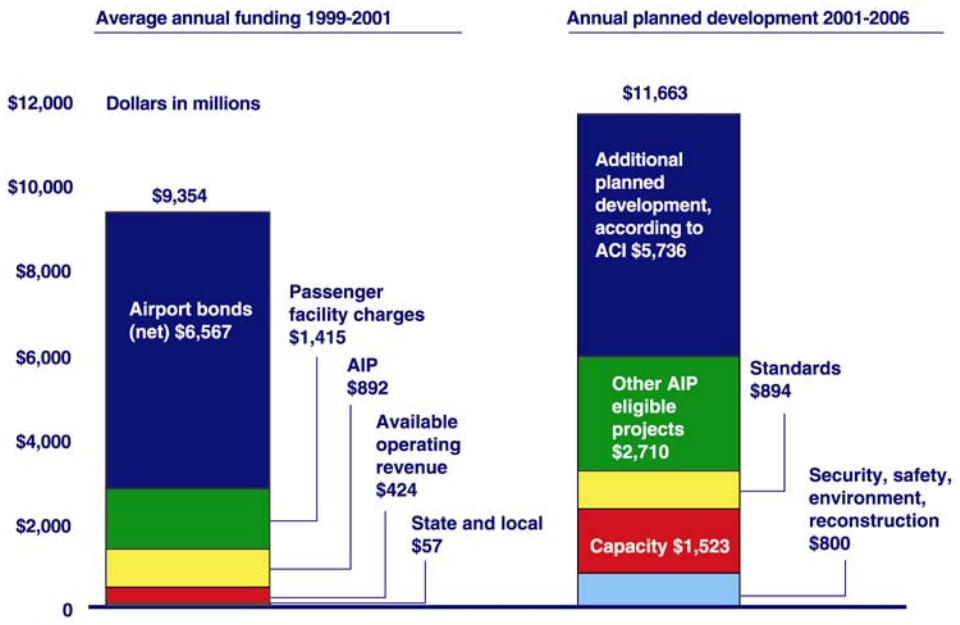
[6] It is also important to note that if we replaced the AIP figures for 1999 through 2001 with the AIP figures appropriated for fiscal year 2002 and authorized for fiscal year 2003 in our analysis, assuming no changes in the distribution of AIP funds, smaller airports would be able to cover even more of the estimated cost of their planned development because AIP grant funds for fiscal years 2002 and 2003 are about $1 billion more than the average annual AIP funding for 1999 through 2001. Because data for funding from other sources were not available for these years, we used the figures for 1999 through 2001, the most recent years for which consistent data were available.

Figure 4: Average Annual Funding Compared with Estimated Annual Planned Capital Development for Smaller Airports



Sources: FAA and ACI (data), GAO (analysis).

Figure 5: Average Annual Funding Compared with Estimated Planned Capital Development for Large- and Medium-Hub Airports



Sources: FAA and ACI (data), GAO (analysis).

Note: The total for average annual funding may not add because of rounding.

Options Are Available to Address Difference between Funding and Planned Development

Options are available to increase airport funding or to make better use of the existing funding. These options, some of which were authorized or implemented as part of AIR-21, include increasing the AIP grant funding for smaller airports, increasing passenger facility charges, and using innovative financing approaches. The various options would benefit different types of airports to varying degrees.

To help address the difference between funding and planned development, AIR-21 provided that up to $150,000 a year in AIP grant funds be made available to all general aviation airports for up to 3 years for airfield capital projects such as runways, taxiways, and airfield construction and maintenance projects. In our report issued yesterday, we reported that since the program's inception in fiscal year 2001, general aviation airports have received a total of about $325 million, which they have used primarily to help build runways, purchase navigational

aids, and maintain pavements and airfield lighting.[7] Most of the state aviation officials and general aviation airport managers we surveyed said the grants were useful in meeting their needs, and some suggested that the $150,000 grant limit be increased so that general aviation airports could undertake larger projects. However, a number of state officials cautioned that an increase in the general aviation entitlement grant could cause a decrease in the state apportionment fund, which states use to address their aviation priorities.

Another option would be to increase or eliminate the cap on passenger facility charges. This option would primarily benefit larger airports, because passenger facility charges are a function of the volume of passenger traffic. However, under AIP, airports that collect passenger facility charges must forfeit a certain percentage of their AIP formula funds. These funds are subsequently divided between the small airport fund, which is to receive 87.5 percent, and the discretionary fund, which is to receive 12.5 percent. Thus, smaller airports would benefit indirectly from any increase in passenger facility charges. In our 1999 report on passenger facility charges,[8] we estimated that a small increase in passenger facility charges would have a modest effect on passenger traffic. At that time, we estimated that each $1 increase would reduce passenger levels by about 0.5 to 1.8 percent, with a midrange estimate of 0.85 percent. Since AIR-21 raised the cap on passenger facility charges from $3.00 to $4.50, the full effect of the increase has not been realized because only 17 of the 31 large-hub airports (55 percent) and 11 of the 37 medium-hub airports (30 percent) have increased their rates to $4.50. Additionally, 3 large-hub airports and 6 medium-hub airports do not charge a passenger facility fee. The reluctance to raise passenger facility charges is likely to be the result of several factors, including the views of airlines, which are opposed to any increase in passenger facility charges because an increase would raise passenger costs and reduce passenger traffic. Nonetheless, if all airports were to increase passenger facility charges to the current ceiling, additional revenue could be generated.

FAA has introduced other mechanisms to make better use of existing funding sources, the most successful of which has been letters of intent, a tool that has effectively leveraged private sources of funding. A letter of intent represents a nonbinding commitment from FAA to provide multiyear funding to an airport beyond the current AIP authorization period. Thus, the letter allows the airport to

[7]U.S. General Accounting Office, *Aviation Finance: Implementation of General Aviation Entitlement Grants,* GAO-03-347 (Washington, D.C.: Feb. 11, 2003).

[8]U.S. General Accounting Office, *Passenger Facility Charges: Program Implementation and the Potential Effects of Proposed Changes,* GAO/RCED-99-138 (Washington, D.C.: May 19, 1999).

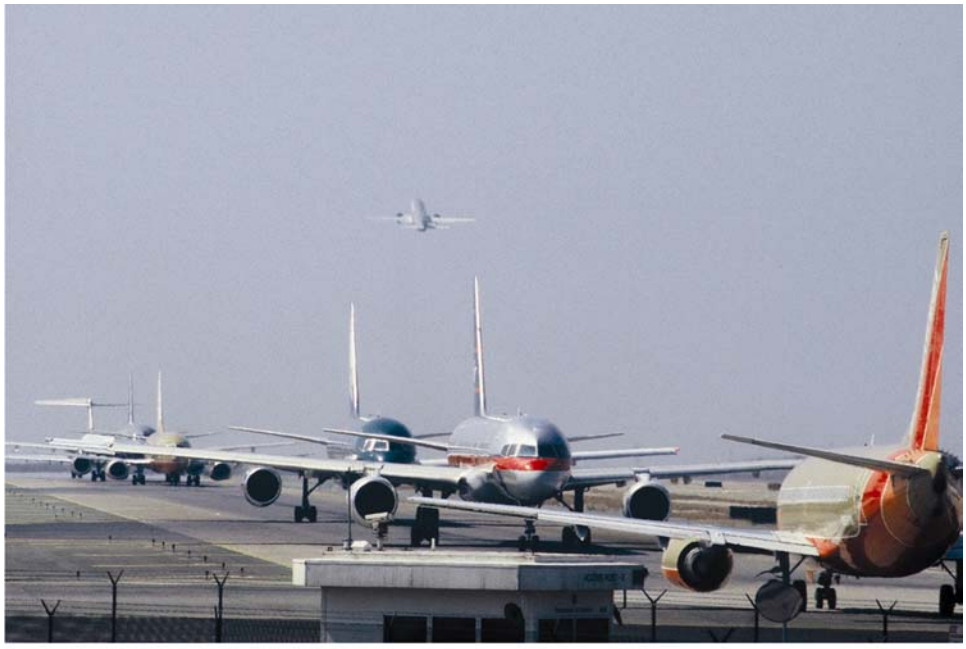
proceed with a project without waiting for a future AIP grant because the airport and investors know that allowable costs are likely to be reimbursed. A letter of intent may also enable an airport to receive a more favorable interest rate on bonds that are sold to refinance a project because the federal government has indicated its support for the project. FAA has issued 64 letters of intent with a total commitment of about $3 billion; large- and medium-hub airports account for the majority of the total.

Other approaches to making better use of existing funding resources were authorized under AIR-21. Specifically, the act authorized FAA to continue its innovative finance demonstration program, which is designed to test the ability of innovative financing approaches to make more efficient use of AIP funding. Under this program, FAA enabled airports to leverage additional funds or lower development costs by (1) permitting flexible local matching on some projects, (2) purchasing commercial bond insurance, (3) paying interest costs on debt, and (4) paying principal and interest debt service on terminal development costs incurred before the enactment of AIR-21. FAA has provided about $31 million for smaller airports to test these innovative uses of AIP funding. According to FAA officials, the results of the program have been mixed. The most popular option for airports has been flexible matching, which has resulted in several creative loan arrangements.

Improvements in Capacity and Efficiency Will Be Needed to Meet Future Demand

Ensuring the efficient operation of the national airspace system is an important reauthorization issue that is vital to improving mobility and supporting economic growth. Despite the overall decline in air traffic since September 11, demand is gradually increasing, and at some airports, especially those in the Midwest, recovery is progressing more rapidly. To avoid the congestion and delays that plagued air traffic before September 11, FAA, airlines, and airports are continuing to pursue capacity-enhancing efforts, such as building new runways, making more efficient use of existing capacity, and better managing the acquisition of air traffic control technology. Figure 6 illustrates congestion at a major airport.

Figure 6: Aircraft Lined Up to Take Off



Source: Used by permission.

FAA's Operational Evolution Plan Encompasses Capacity and Efficiency Improvements

In December 2002, FAA published the most recent version of its Operational Evolution Plan, a 10-year plan to increase the capacity and efficiency of the national airspace system, primarily by focusing on building runways. If successfully carried out, the plan would substantially increase capacity and improve efficiency. However, FAA faces several challenges in implementing the plan. First, the success of the plan depends on adequate funding and on the consensus of FAA's aviation industry partners. Yet according to the most recent version of the plan, the timing and implementation of some activities may be in jeopardy because of the current economic situation and the uncertain viability of some industry participants. For example, the plan calls for the airline industry to invest $11 billion in new equipment for aircraft. FAA is currently reviewing the ability of the airlines to make this investment. Second, as noted, the plan relies heavily on runway development to increase capacity, but the most recent version reports mixed results in building new runways. While the plan indicates that one new runway will be built, it points out that another runway has been cancelled and the construction of six additional runways has been delayed because of local situations. Furthermore, building new runways would be difficult at several of the most delay-prone airports, such as La Guardia, Newark, Kennedy, Los Angeles, and San Francisco, because these airports either are out of room or

would face intense local opposition. Persistent delays at key airports such as these will continue to create "choke points" that slow air traffic throughout the system. In addition, AIR-21 requires the phaseout of slot restrictions at Chicago O'Hare by July 1, 2002, and at LaGuardia and John F. Kennedy airports by 2007. Because slot restrictions limit the number of gates at an airport, their phaseout could lead to an increase in air traffic. According to the Operational Evolution Plan, FAA is undertaking a number of efforts to address problems at choke points, such as rerouting aircraft and adding technology.

Building Runways Is Challenging and Takes a Long Time

Our work has found that airports face many of the same challenges and delays in building new runways that FAA reported in the Operational Evolution Plan. In January 2003, we reported that airports spent about 10 years planning and building recently completed runways and expect to spend about 14 years on runways that are not yet completed.[9] Several external factors affect how much time is spent planning and building runways, and several airports with unfinished runway projects identified significant challenges that had delayed their projects' completions. While many airports believed that completing the environmental review phase was a significant challenge, they also described other phases of the runway development process as equally challenging. For example, airport officials in Los Angeles and Boston said that they faced significant challenges in reaching agreement with community interest groups during the planning phase. In Boston, differences with these groups have led to lengthy litigation. Other airports said that mitigating the potential impact of aircraft noise on the surrounding community continues to be a challenge because of heightened community concerns about noise.

Although there may be no single solution to all of the issues involved in planning and building runways, the federal government and airport authorities have taken some actions. For example, a recent executive order is designed to streamline the environmental review of transportation infrastructure projects. In addition, FAA has taken several actions to increase communication and coordination and streamline the planning and environmental review of runway projects. Some airports said these actions could help airports resolve challenges more quickly; however, we believe it is too early to assess the impact of these actions on the runway development process.

[9]U. S. General Accounting Office, *Aviation Infrastructure: Challenges Related to Building Runways and Actions to Address Them,* GAO-03-164 (Washington, D.C.: Jan. 30, 2003).

Our work has shown that airports have also tried to address the challenges in building runways by, for example, involving local stakeholders, such as community groups, at the beginning of the process and reaching early agreement on how to mitigate the adverse effects of runway projects. Airports said these efforts helped to facilitate the completion of their projects and could be useful for other airports considering runway projects. However, the variety of situations that airports described and the different levels of challenges they face make it difficult to generalize from one airport's experience to another's.

Recognizing that building new runways is not always a practicable way to increase capacity at some airports, we identified three alternatives to building runways:[10]

- Add capacity by using nearby airports that have available capacity or by building new airports.
- Find ways to manage and distribute demand within the system's existing capacity by, for example, limiting the number of takeoffs and landings during peak periods or limiting the ability of aircraft, other than those operated by airlines, to use especially crowded or sensitive airports (under current law, all aircraft have equal access to even the largest airports).
- Develop other modes of intercity travel, such as high-speed rail, where metropolitan areas are relatively close, to form an integrated, intermodal transportation network.

These alternatives would require extensive change, could conflict with the interests of one or more key stakeholder groups, and would often be costly. Nevertheless, they may be essential to accommodate expected increases in the demand for efficient transportation services or to address security and other concerns prompted by the terrorist attacks. To facilitate their implementation, we believe that the federal government will need to assume a central role. Accordingly, we have recommended that the Department of Transportation (DOT) begin a more extensive evaluation of initiatives to address flight delays, including intermodal solutions and a dialogue with the aviation community and other transportation stakeholders as a basis for developing a comprehensive blueprint for addressing the nation's long-term transportation needs. DOT has recognized the need for more and better long-range planning on the potential use

[10]U.S. General Accounting Office, *National Airspace System: Long-Term Capacity Planning Needed Despite Recent Reduction in Flight Delays,* GAO-02-185 (Washington, D.C.: Dec. 14, 2001).

of such measures, but its efforts are in the beginning stages. The current hiatus in air traffic growth creates an opportunity for such planning to take place.

FAA's Air Traffic Modernization Effort Remains High Risk

To increase the safety, capacity, and efficiency of the national airspace system, FAA undertook a major effort in 1981 to modernize and replace aging air traffic control equipment. This effort has been plagued by cost overruns, schedule delays, and performance shortfalls. In 1995, we designated it as high risk, and we continue to designate it as such.[11] Inefficiencies in the air traffic control system contributed to some of the delays in the system that peaked in 2000. At that time, FAA estimated that modernizing equipment along with other changes, such as redesigning the airspace, would increase capacity by 5 to 15 percent.

Originally, FAA planned to complete its modernization in 10 years at a cost of $12 billion. Now, two decades and $35 billion later, FAA estimates that it will need nearly $16 billion more through fiscal year 2007 to complete key projects, including the Standard Terminal Automation Replacement System (STARS), the Wide Area Augmentation System (WAAS), the Next-Generation Air/Ground Communications (NEXCOM), the Local Area Augmentation System (LAAS), the Integrated Terminal Weather System (ITWS), and free flight initiatives, which FAA's Operational Evolution Plan recognizes as a new way of managing air traffic that is expected to help lower costs for the airlines and help the aviation system accommodate more flights.

While FAA is making progress in managing the air traffic control modernization, key programs continue to experience cost, schedule, and performance problems. As a result, resources have not been spent cost-effectively and improvements in capacity and efficiency have been delayed. Table 3 shows the status of three major programs that we have been monitoring.

[11]U.S. General Accounting Office *High-Risk Series: An Update*, GAO-03-119 (Washington, D.C.: Jan 2003).

Table 3: Selected Air Traffic Control Modernization Acquisition Projects

	Estimated cost		Projected deployment schedule		
Project	**Original**	**Current**	**Original**	**Current**	**Status**
Standard Terminal Automation Replacement System (STARS), designed to replace aging displays and processing systems used by air traffic controllers	$940 million	$1.33 billion	Start: 1998 Finish: 2005	Start: 2002 Finish: 2005	FAA's latest cost and schedule for STARS is based on acquisition of 74 systems, as opposed to the original 172 systems. In September 2002, we found that FAA's schedule for deploying STARS to a large facility presents challenges in terms of completing efforts to test the system, resolve problems, and train all employees on the new system.[a]
Wide Area Augmentation System (WAAS), designed to provide satellite-based navigation for airspace users	$892 million	$2.9 billion	Start: 1998 Finish: 2001	Start: 2003 Finish: to be determined	Integrity concerns have plagued WAAS's development. While the agency has made progress in resolving these, FAA must decide whether to stop WAAS's development in 2003 or continue to refine the technology to provide an approach capability with greater precision.
Next-Generation Air/Ground Communications (NEXCOM), designed to replace existing communications systems and provide additional voice channels	$986 million (1st segment only)	$986 million (1st segment only)	Finish: 2009	Finish: 2013	FAA is only in the early stages of making a final decision to select the technology for NEXCOM and still needs to address three major issues: whether (1) the preferred technology is technically sound and will operate as intended, (2) the preferred technology and equipment it requires can be certified as safe for use in the national airspace system, and (3) it is cost-effective for users and the agency.

Source: FAA.

Note: Dollars are nominal.

[a]U.S. General Accounting Office, *National Airspace System: Status of FAA's Standard Terminal Automation Replacement System*, GAO-02-1071 (Washington, D.C.: Sept. 17, 2002).

DOT's Inspector General has noted similar problems with the Local Area Augmentation System—a new precision approach and landing system that is expected to boost airport arrival rates under all weather conditions—and the Integrated Terminal Weather System—which provides enhanced weather information. FAA planned to begin operating the Local Area Augmentation System in 2004, but it will not meet that milestone because of additional development work, changing requirements, and unresolved safety certification

issues. In addition, the estimated production costs for the Integrated Terminal Weather System, originally expected to be about $286 million, have tripled.[12]

Our work has also identified free flight implementation issues. Free flight is a new approach to air traffic management that replaces highly structured rules and procedures with a more flexible system based on collaboration between air traffic controllers and pilots. The use of new free flight technologies and procedures is expected to increase the efficiency and capacity of the airspace system and help to avoid gridlock by improving operations in various segments of flight. In 2001, we made several recommendations to improve the implementation of free flight, including improving training for air traffic controllers and establishing detailed tracking of costs, schedules, and benefits.[13] FAA has begun to address our recommendations. However, several outstanding issues remain. For example, the airlines are not likely to voluntarily equip their fleets with new technologies to support free flight until their business improves.

Since 1995, we have made over 30 recommendations to address the root causes of FAA's modernization problems. Although FAA has made progress in addressing these root causes, more remains to be done, including the following:

- Improve immature software capabilities. FAA has developed an integrated framework for improving its software acquisition, software development, and systems engineering processes. In addition, FAA has continued to increase the number of system development projects that use this integrated framework. However, FAA still does not require all systems to achieve a minimum level of progress within the framework before being funded.
- Improve cost-estimating and cost-accounting practices. FAA has developed a standard work breakdown structure and established an historical database for tracking systems' estimated costs and other information. Furthermore, FAA has made progress in implementing its cost-accounting system. However, the agency has not yet fully instituted rigorous cost-estimating practices—that is, FAA is not yet incorporating actual costs from related system development efforts in its processes for estimating the costs of new projects. Most recently, we reported that the cost estimates for the Standard Terminal Automation Replacement

[12]DOT Office of Inspector General, *Top Management Challenges,* PT-2003-012 (Washington, D.C.: Jan. 21, 2003).

[13]U.S. General Accounting Office, *National Airspace System: Free Flight Tools Show Promise, But Implementation Challenges Remain,* GAO-01-932 (Washington, D.C.: Aug. 31, 2001).

System are unreliable because FAA did not follow its own acquisition guidance.[14]

- Change organizational culture. FAA issued an organizational culture framework in 1997 and is working to implement it. However, in 2000, the DOT Inspector General followed up on problems that we first identified in 1996[15] and reported that FAA's culture remains a barrier to successful acquisition project management and that integrated teams, a key mechanism to deliver more cost-effective and timely products, are not working well because FAA's culture continues to operate in vertical "stovepipes," which conflict with the horizontal structure of team operations. Our 2000 report on the Wide Area Augmentation System also found that the integrated teams were not working as intended.[16] We found that competing priorities between two key organizations that are part of the system's integrated team negated the effectiveness of the team's approach for meeting FAA's goals for the system.

As FAA moves forward with modernization in the current economic climate, it will be important for the agency to ensure that it is spending its resources on the projects that will provide the most return. This may require reprioritizing projects in the agency's investment portfolio, cooperating more closely with private industry to leverage federal dollars and share the risk of investments, and seeking other opportunities to reduce costs and operate more efficiently. Such activities would be under the purview of the Air Traffic Services Subcommittee and the chief operating officer, a position created by AIR-21 to oversee the air traffic control system and FAA's modernization program. However, FAA has not yet hired a chief operating officer to direct these efforts.

FAA Is Implementing Human Capital and Procurement Reforms

As problems with the air traffic control modernization program mounted in the early 1990s, FAA attributed the delays in implementing air traffic control projects, at least in part, to burdensome governmentwide human capital rules and federal acquisition regulations that impeded its ability to hire, train, and deploy personnel and to acquire equipment and systems. In response to these claims, the Congress exempted FAA from many federal laws governing human capital and

[14]U.S. General Accounting Office, *National Airspace System: Better Cost Data Could Improve FAA's Management of the Standard Terminal Automation Replacement System,* GAO-03-343 (Washington, D.C.: Jan. 31, 2003).

[15]U.S. General Accounting Office, *Aviation Acquisition: A Comprehensive Strategy Is Needed to Cultural Change at FAA,* GAO/RCED-96-159 (Washington, D.C.: Aug. 22, 1996).

[16]U.S. General Accounting Office, *National Airspace System: Persistent Problems in FAA's New Navigation System Highlight Need for Periodic Reevaluation,* GAO/RCED/AIMD-00-130 (Washington, D.C.: June 12, 2000).

acquisitions, and the agency began implementing human capital and procurement reforms in 1996.

Human Capital Reforms Have Not Been Fully Implemented, Evaluated, or Linked to Goals

As we reported last week, FAA has implemented the majority of its human capital reform initiatives, but it has not yet completed this effort. (Fig. 7 shows the status of several key initiatives.) For example, it has not implemented a new compensation system for about 20 percent of its 50,000 employees—those staff whose unions have not reached agreements with FAA. Among the factors affecting FAA's progress in implementing this initiative were the wide range of skills represented in FAA's workforce and the multiple unions representing FAA employees.

Figure 7: Implementation Status of Selected FAA Personnel Reform Initiatives

Reform area	Initiatives	Status
Compensation and performance management	Broadbanded pay systems	In progress
	Performance appraisals without ratings	In progress
Workforce management	Workforce planning	In progress
	Decentralized competitive hiring	Completed
	Delegated training management	Completed
	Flexible relocation policies	Completed
Labor and employee relations	Labor partnership forums	Completed
	Workplace improvement policies	Completed

In progress
Completed

Source: FAA (data), GAO (analysis).

FAA has not developed data to assess the effects of its human capital reforms. For example, it has not systematically surveyed managers and employees or analyzed their views on the new compensation system. Although FAA human capital officials cited positive effects of the system, nearly two-thirds (110 out of 176) of the managers and employees we interviewed disagreed or strongly disagreed that the new system is fair to all employees.

The lack of data on the effects of its human capital reforms is an indication that FAA has not fully incorporated elements that are important to effective human capital management into its overall reform effort. These elements include data collection and analysis, performance goals and measures, and links between

reform goals and program goals. Evaluations of FAA's human capital reforms have cited these shortcomings, but FAA has not developed specific steps and time frames for building the missing elements into its human capital management and for using these elements to evaluate the effects of its initiatives, make strategic improvements, and hold the agency's leadership accountable.

Addressing these weaknesses and developing a more strategic approach to its human capital reforms is particularly important as FAA faces the likelihood of hiring thousands of air traffic controllers in the next decade to replace retiring controllers. While the exact number and timing of the controllers' departures is impossible to determine, FAA's and our analyses show that the attrition rate will grow substantially in the near and long term as thousands of controllers hired over a 3- to 4- year period in the 1980s become eligible to retire. In June 2002, we reported that FAA's strategy for replacing controllers was generally to hire new controllers only when current, experienced controllers leave—an approach that makes it challenging to ensure that well-qualified new controllers are available when needed.[17] For example, we found that FAA's hiring process did not adequately take into account the time needed to fully train replacements, which could take up to 5 years; there was uncertainty about agency's tools for screening and testing the aptitude of applicants; and the agency had not addressed the resources that may be needed to train these replacements. We recommended, among other things, the development of a comprehensive workforce strategy to address FAA's impending controller needs. While FAA has made some changes in this area since our report appeared, it remains to be seen whether the agency's actions will be sufficient to ensure that qualified new controllers are available when needed. Figure 8 shows an air traffic controller monitoring and handling air traffic.

[17]U.S. General Accounting Office, *Air Traffic Control: FAA Needs to Better Prepare for Impending Wave of Controller Attrition,* GAO-02-591 (Washington, D.C.: June 14, 2002).

Figure 8: Air Traffic Controller

Source: FAA.

FAA's Procurement Reforms Have Improved Investment Management Processes, but Weaknesses Remain

As part of its procurement reforms, FAA introduced an acquisition management system to reduce the time and cost to deploy new products and services. In 1999, we found that while this was a good first step in establishing a structured investment management approach for selecting and controlling the agency's investments, the system had weaknesses in its selection, control, and evaluation phases that impeded FAA's ability to manage its investments effectively and make sound decisions about continuing, modifying, or canceling projects.[18] We concluded that correcting these weaknesses would increase the likelihood that FAA's projects would meet established cost and schedule objectives and contribute to measurable improvements in the agency's mission performance, and we made several recommendations designed to improve the agency's selection, control, and evaluation of its information technology investments.

[18]U.S. General Accounting Office, Air *Traffic Control: FAA's Modernization Investment Management Approach Could Be Strengthened,* GAO/RCED/AIMD-99-88 (Washington, D.C. Apr. 30, 1999).

Recently, we found that FAA has improved its investment management processes, but that more remains to be done. For example, FAA is now overseeing investment risks and capturing key information from the investment selection process in a management information system. FAA has also developed guidance for validating costs, benefits, and risks, and expects to finalize this guidance by early 2003. However, FAA has not yet implemented processes for evaluating projects after implementation in order to identify lessons learned and improve the investment management process. Because its procurement reform effort is not complete, major projects continue to face challenges that could affect their costs, schedule, and performance.

FAA Is Making Progress in Implementing Safety Initiatives

Safety has always been and continues to be FAA's highest priority. FAA has taken a number of important steps to improve aviation safety; however, planning and implementation could be more effective in some cases.

FAA and Industry Have Taken Actions to Reduce the Fatal Accident Rate

Reducing fatal aviation accidents is key to improving aviation safety. FAA's centerpiece for reaching this goal is Safer Skies, an initiative that dates back to 1998, when FAA and aviation industry representatives worked together to identify the major causes of fatal accidents and to design and implement preventive actions. Safer Skies is intended to reduce the fatal accident rate for commercial aviation by 80 percent and to reduce the number of fatal accidents for general aviation to 350 by 2007.[19] Because many preventive actions have not yet been fully implemented, it may be too early to assess their effectiveness. Achieving the initiative's goals will require FAA to systematically implement these preventive actions and to maintain good data to monitor their progress and evaluate their effectiveness. As of last week, 44 preventive actions had been undertaken—of which 16 are completed and 28 are under way, according to FAA.

FAA's New Safety Inspection System Offers Promise, but Problems Still Need to Be Addressed

Improving the effectiveness of FAA's inspections of airline operations is key to improving aviation safety. The FAA Administrator has noted that perhaps the greatest support the agency can provide to the industry is a robust safety oversight role that will not waver in difficult times. FAA's new inspection program, the Air Transportation Oversight System, is central to this oversight

[19]Commercial aviation includes both large air carrier operations and smaller commuter operations. General aviation includes a wide variety of aircraft, ranging from corporate jets to small piston-engine aircraft as well as helicopters, gliders, and aircraft used in operations such as firefighting and agricultural spraying.

role. The program aims to ensure not only that airlines comply with FAA's safety requirements but also that they have operating systems to control risks and prevent accidents. We found that FAA had not completed many critical steps, such as developing guidance and creating usable databases to capture information, before implementing the new inspection system in 1998. As a result, the agency's ability to conduct effective inspections remains limited. FAA has begun to address some of these problems. However, according to a 2002 review by the DOT Inspector General, many of the problems persist, and the program's implementation remains inconsistent because FAA has not established strong oversight and accountability procedures.[20] These problems limit FAA's ability to conduct more systematic, structured inspections; analyze the resulting data to identify safety trends; and target its resources to the greatest aviation safety risks.

Better Implementation and Monitoring of Requirements to Perform Preemployment Checks on Pilots Could Enhance Aviation Safety

Finally, the Congress has endeavored to keep unsafe pilots out of the cockpits of commercial aircraft by requiring that carriers perform preemployment checks on pilot applicants. We found that carriers have increasingly requested the required records since the Pilot Records Improvement Act took effect in 1997. In 2000, nearly half of the nation's large commercial airlines reported deciding not to hire pilots because of this information. However, our data analyses and surveys of carriers showed that a few carriers did not request all required records. In a few cases, hiring carriers reported never receiving the records. Delays in providing the records can be costly for both carriers and pilots because the carrier is not allowed to use the pilot to fly passengers or cargo until the records have been received. In addition, because FAA did not update its guidance when the law was amended, carriers and pilots lack awareness of some provisions, and FAA inspectors are not prepared to review compliance. In response to our recommendations, FAA has updated its guidance and is taking additional steps to better inform carriers, pilots, and inspectors of the law's requirements.

In conclusion, Mr. Chairman, the aviation industry and the national economy are still struggling to recover their health. Analysts nonetheless expect the demand for air travel to rebound, and the nation's aviation system must be ready to accommodate the projected growth safely and securely. Sustaining recent funding levels for planned capital development should allow the majority of airport capital improvements to move forward, but it will not address the costly

[20]U.S. Department of Transportation, Office of Inspector General, *Report on the Air Transportation Oversight System: Federal Aviation Administration*, AV-2002-088 (Washington, D.C.: Apr. 8, 2002).

terminal modifications needed to accommodate explosives detection systems. Options such as additional federal grant funding or increases in passenger facility charges could make more funding available for airport improvements; however, competition for federal budget dollars and concerns about the impact of higher charges on airline ticket sales may limit the practicality of these options.

Enhancing the capacity and efficiency of the national airspace system through runway development and air traffic modernization is critical to preparing for the projected growth in demand for air travel. Today, we have a window of opportunity to prepare for this growth without the pressures of congestion and flight delays. Yet we also face public and private constraints on spending that require us to accomplish these improvements as efficiently as possible. Setting priorities among projects, identifying opportunities for streamlining the runway development process, and fully implementing human capital and procurement reforms should help to ensure efficiency. Finally, moving forward with aviation safety initiatives is essential to restore and maintain the public's confidence in air travel.

Scope and Methodology

To determine how much planned development would cost over the next 5 years, we obtained planned development data from FAA and ACI. ACI provided its estimate to us in January 2003, and we are still analyzing the data on which the estimate is based. To determine the sources of airport funding, we obtained capital funding data from FAA, the National Association of State Aviation Officials, Thomson Financial, and a survey we conducted of 400 general aviation and reliever airports. We obtained funding data from 1999 through 2001, because they were the most recent years for which consistent data were available. We screened the planned development and funding data for accuracy and compared funding streams across databases where possible. We also clarified ambiguous development or funding source information directly with airports. We did not, however, audit how the databases were compiled, except for our own survey. However, we have not finished analyzing our survey data, and the results presented in this testimony are still preliminary.

We performed our work from May 2002 through February 2003 in accordance with generally accepted government auditing standards.

This concludes my statement. I would be pleased to answer any questions you or other members of the Committee might have.

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